IN THE UNITED STATES DISTRICT COURT

FOR THE WESTERN DISTRICT OF WISCONSIN

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GENERAL ELECTRIC COMPANY, GE MEDICAL SYSTEMS (NORWAY) AS, GE YOKOGAWA MEDICAL SYSTEMS, LTD., GE MEDICAL SYSTEMS GLOBAL TECHNOLOGY COMPANY, LLC, GE MEDICAL SYSTEMS, ULTRASOUND & PRIMARY CARE DIAGNOSTICS LLC and GE MEDICAL SYSTEMS, INC.,

ORDER AND OPINIONS

Plaintiffs and Counter-Defendants,

07-cv-273-bbc

v.

SONOSITE, INC.,

Defendant and Counter-Plaintiff.

- -

In this patent infringement lawsuit, plaintiffs and counter-defendants General Electric Company, GE Medical Systems (Norway) AS, GE Yokogawa Medical Systems Ltd., GE Medical System Global Technology Company, LLC, GE Medical Systems, Ultrasound & Primary Care Diagnostics LLC and GE Medical Systems, Inc. and defendant and counter-plaintiff Sonosite, Inc. each contend that the opposing party infringes patents they own and that some of the patents asserted against them are invalid.

Now before the court are the parties' cross-motions for partial summary judgment on all of the disputed claims. In this order, I address in seven separate opinions the motions directed to plaintiffs' patents nos. 4,932,415, 5,584,294, 6,120,477, 6,102,859 and 6,418,225 and to defendant's patents nos. 6,471,651 and 6,364,839. Opinions resolving the disputes over the remaining patents: plaintiffs' patent no. 6,210,327 and defendant's patents nos. 6,569,101 and 6,962,566 will be issued shortly.

PATENTS OWNED BY PLAINTIFFS

I. PLAINTIFFS' UNITED STATES PATENT NO. 4,932,415

Plaintiffs contend that defendant's MicroMaxx, Titan and Turbo ultrasound systems infringe claims 1, 3, 4 and 5 of their '415 patent. Defendant has moved for summary judgment on the ground that none of the accused products infringe, either literally or by equivalence. Because I conclude that no reasonable jury could find infringement, defendant's motion will be granted.

From the parties' proposed findings of fact, I find the following facts to be material and undisputed.

A. Undisputed Facts

1. Asserted claims

United States Patent No. 4,932,415 (the '415 patent) is entitled "Method of Color Coding Two Dimensional Ultrasonic Doppler Velocity Images of Blood Flow on a Display." The disputed claim language is included in claim 1, the only independent claim of the patent. Claim 1 discloses:

> 1. A method for color-coded imaging of blood flow velocities in a field onto a display, comprising the steps of:
>
> scanning an ultrasonic beam pulsed at a pulse repetition frequency across the field to provide a Dopplershifted backscattered signal from a discrete set of range cells in the field;
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> sampling the backscattered signal from the range cells along the beam;
>
> estimating predetermined parameters from the backscattered signal from each range cell, said parameters comprising the mean frequency, the power and the bandwidth of the backscattered signal;
>
> assigning, on the basis of said parameters, predetermined colors for imaging the blood flow velocities on the display, such that for low bandwidth, the mean frequency is assigned to a range of selected first colors which are predeterminately varied as the mean frequency varies, in both the positive and negative sense, from zero frequency to the pulse repetition frequency of the beam, and for increasing bandwidth said first colors are gradually replaced with a single second color until, at large bandwidths, only said single second color is assigned to the display, said single second color being selected to strongly contrast with said first colors; and
>
> mapping the assigned colors for both positive and negative mean frequencies onto the display, whereby the displayed image presents the full range of blood flow velocities in the field such that different flow conditions ma be readily distinguished.

The '415 patent relates to the occurrence of "high bandwidth," that is, circumstances

in which speed and direction of blood flow cannot be determined precisely. It addresses one way to portray blood flow when either aliasing or turbulence occurs. When there is "turbulence or very high velocity flow," the '415 patent teaches the use of a single color to indicate those regions where the ultrasound system detects this activity. This is to easily depict areas where turbulence occurs. As described in the Summary of the Invention:

> In accordance with the present invention, the Doppler information is displayed using a color-coding scheme wherein laminar flow is depicted by a continuous range of colors, while turbulence or very high velocity flow is represented by a single, contrasting color so as to clearly and readily indicate to an observer those areas in which turbulent or very high velocity flow is present, and thereby enable the viewer to quickly and clearly differentiate those areas from areas of laminar flow and recognize the interrelationships between those areas.

In the preferred embodiment, green is the single color used to denote these regions. In prior art methods, the "single color" or "second color" was blended with the other colors to depict turbulence or aliasing. The patent specification explains that "[the present invention] is in contrast to currently commercially-used color scales wherein, for example, a green component proportional to the bandwidth is typically added to the existing red and blue colors producing a mosaic patter of yellow and cyan, or of yellow and green, which does not strongly contrast with the background." Col. 6, lns. 60-66.

2. Background regarding the operation of Doppler ultrasound

The use of color Doppler ultrasound allows the measurement and display of the speed and direction of blood flow within veins, arteries, the heart and other areas of the body. The Doppler effect refers to the acoustic phenomenon in which the frequency of a sound wave differs depending on whether the source of the sound is approaching or receding. The velocity and direction of the moving source of the sound can be calculated if one knows how the frequency changes over time.

In the technology described in the '415 patent, a probe emits sound waves at a specific frequency. When the sound waves emitted from the probe encounter components flowing in the blood, such as red blood cells, the sound waves are reflected back at the probe with a shifted frequency. The ultrasound system collects and measures these frequencies from a specific location. The mean frequency and "frequency shift" are used to determine average speeds and directions for the blood flow, which are then displayed on the screen of the ultrasound system using various colors. In some situations, the ultrasound system cannot make a precise determination of the speed and direction of blood flow. For example, when the mean frequency of the reflected sound waves reaches a certain level, known as the "Nyquist limit," it can no longer be correlated accurately with speed and direction. "Aliasing" is associated with high velocity blood flow and occurs when the correlations become ambiguous; it may begin to occur at mean frequencies just below the Nyquist limit.

When blood flow is turbulent, or when aliasing occurs, (that is, when different

continuous signals become indistinguishable) the ultrasound system senses an array of frequency shift values from a particular location. "Bandwidth" represents a range of different frequency shift values that the device detects at a particular location. When the bandwidth is narrow, the average velocity and direction of blood flow may be calculated with a high degree of confidence. Conversely, when bandwidth is wide, no accurate calculation can be made.

On computer monitors, the color of each pixel is specified as a combination of red, green and blue light of varying intensities. Those intensities range from 0 (none) to 255 (brightest) for each color. Red, green and blue can be added together in various proportions to create other colors.

3. Operation of the accused devices

Defendant's Titan, MicroMaxx and M-Turbo products use numerous colors to display variance and mean frequency data. The products add a green component proportional to the bandwidth to existing red and blue colors to depict turbulence. In addition, the products add a green component proportional to the level of mean frequency. As mean frequency increases, either positively or negatively, more green is added to the red and blue colors in order to depict variance. As green is mixed in higher proportions with the reds and blues as mean frequency and bandwidth increase, the colors change.

At the highest level of variance, the color maps for the accused products display a range of colors, including green, for different mean frequencies. On the MicroMaxx color map, the area of highest variance and a mean frequency level of -20 is associated with a deep blue-green color. The area of highest variance level and a mean frequency level of -32 is associated with a bright green color. Defendant's S-Series systems cannot produce velocity plus variance maps.

B. Opinion

The parties appear to agree about the basic function of the accused products. They provide color representations of Doppler ultrasound data in which color is assigned to data using a "color map." In the accused products, green is used to represent areas of high turbulence, or bandwidth, and areas of high mean velocity. The products add a green component proportional to the bandwidth to existing red and blue colors to depict turbulence and represent changes in mean frequency. Even at the highest levels of variance, the accused products do not display a single color over a range of mean frequency levels.

The question is whether products that function in this way perform each step of the method disclosed in the claims of the '415 patent and therefore infringe plaintiffs' patent either literally or by equivalence. Defendant first argues that the blended colors used to represent intermediate levels of bandwidth and frequency do not satisfy the requirement that

"for increasing bandwidth said first colors are gradually replaced with a single second color" because there is no single, identifiable green color used to replace the first colors. Instead, a range of shades or colors is created when green is added to the red and blue first colors. In response, plaintiffs assert that it is good enough that all of the colors are shades of green created by adding green elements to the first colors.

I need not resolve this dispute, because it is clear that the accused products do not meet another limitation of claim 1. Even at the highest bandwidth levels, the accused products display a range of colors depending on the mean frequency level. The fourth step of claim 1 of the '415 patent discloses that "for increasing bandwidth said first colors are gradually replaced with a single second color until, at large bandwidths, only said single second color is assigned to the display, said single second color being selected to strongly contrast with said first colors . . . ." I have construed this term to mean "as bandwidth increases continuously or in regular steps, said first colors are replaced continuously or in regular steps, with a single second color until, at large bandwidths, only said single second color is assigned to the display." Defendant sought to include in the construction a limitation that, after a certain "minimum threshold," only the second color was displayed. I agreed with defendant that the patent requires that, at some point of sufficiently high bandwidth, only the single, second color is displayed, but concluded that adding the requirement that this occur at some "minimum threshold" limited the claim language

inappropriately.

In the accused products, there is never a large bandwidth level at which only the single second color (green) is assigned to the display. Thus, the accused products do not literally infringe. Plaintiffs acknowledge as much, but maintain that there is a material factual dispute whether the products infringe by equivalence.

Under the doctrine of equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." Warner-Jenkinson Co. v. Hilton Davis Chemicals Co., 520 U.S. 17, 21 (1997). A broad, overall equivalence between an accused product and a patented invention is not enough; rather, "[e]ach element contained in a patent claim is deemed material to defining the scope of a patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole." Id. at 29; Freedman Seating Co. v. American Seating Co., 420 F.3d 1350, 1358 (Fed. Cir. 2005). There are several formulations of the test for determining whether a product infringes under the doctrine of equivalence. However, regardless of the test used, the essential inquiry is whether "the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention." Warner-Jenkinson Co., 520 U.S. at 40.

Distilled, plaintiffs' argument appears to be that the overall benefit of using a single color to represent high bandwidth and high mean frequency provides the same benefit as using a single color to represent high bandwidth at all mean frequencies. If this were true, there would be no need for the patent to specify that "at large bandwidths, only said single second color is assigned to the display." Instead, this claim element could have been eliminated entirely and the patent would have precisely the same effect. The accused devices instead assign starkly different colors (red and green and blue and green) even at the highest bandwidth depending on the mean frequency. Under no circumstances could a reasonable jury conclude that this is substantially the same as a method in which "at large bandwidths, only said single second color is assigned to the display."

Accordingly, I conclude that the accused devices do not infringe the '415 patent, either literally or by equivalence. Defendant's motion will be granted with respect to plaintiffs' '415 patent.

II. PLAINTIFFS' UNITED STATES PATENT NO. 5,584,294

Plaintiffs have accused defendant's MicroMaxx, Titan, M-Turbo and S-Series ultrasound systems of infringing claims 1 and 2 of the '294 patent. The parties have filed cross motions for summary judgment with respect to plaintiffs' '294 patent. Plaintiffs have moved for summary judgment on the grounds that the accused products infringe claim 1 of

the '294 patent literally and by equivalence and claims 2 literally. Defendant has moved for summary judgment on the grounds that none of the accused products infringe and the claims are invalid as obvious. Because I conclude that no reasonable jury could find that the '294 patent has been infringed, defendant's motion will be granted and plaintiffs' will be denied. I find it unnecessary to reach defendant's invalidity arguments.

From the parties proposed findings of fact, I find the following facts material and undisputed.

A. Undisputed Facts

United States Patent No. 5,584,294 (the '294 patent) is entitled "Method and Apparatus for Ultrasonic Blood Flow Display." The patent relates to power mode Doppler imaging of blood flow. The patent application that led ultimately to the '294 patent was filed on October 17, 1996, and the patent issued on December 17, 1996. Claims 1 and 2 are the only claims in the patent.

Claim 1, a method claim, discloses:

> 1. A method for ultrasonic blood flow display where a blood flow image by power of an ultrasonic Doppler signal is displayed to a blood flow display region movable within a B-mode image display region,
>
> characterized in that the B-mode image is displayed within said blood flow display region while said blood flow display region is moved.

Claim 2, an apparatus claim, discloses:

> 2. An apparatus for ultrasonic blood flow display, comprising:
>
> B-mode image forming means for forming a B-mode image based on an ultrasonic echo signal;
>
> blood flow image forming means for forming a blood flow image based on power of an ultrasonic Doppler signal;
>
> display means for displaying the B-mode image formed by said B-mode image forming means, and for displaying the blood flow image formed by said blood flow image forming means to a blood flow display region formed within a B-mode image display region;
>
> moving means for moving said blood flow display means; and
>
> display changing means for displaying the B-mode image within said blood flow display region while said blood flow display region is moved.

As set out in these claims, claim 1 of the '294 patent discloses a method in which a movable blood flow display region is displayed on a display screen and B-mode and Doppler flow images can be displayed in this display region or "region of interest." When the region of interest is stationary, the power Doppler flow image is displayed in that region and B-mode image is displayed in the rest of the screen. If the operator moves the region of interest using a mouse or trackball, the blood flow image is not shown in the region of interest.

When an operator of the accused products moves the region of interest, some of the blood flow image may remain visible within the region of interest. When the "Color

Suppress" function is activated in defendant's MicroMaxx and M-Turbo products, the blood flow image is suppressed to allow better viewing of the B-mode image. Defendant's test specifications for the accused products outline 22 tests with respect to the Color Suppress feature; one test includes moving the region of interest while the Color Suppress feature is activated.

B. Opinion

The parties agree that there is no underlying factual dispute regarding the function of the accused products and both have moved for summary judgment in their favor. Given my construction of the claim language, the plain language of claim 1 and defendant's concession that the accused products meet all of the claim limitations but one, the direct infringement analysis is straightforward. Previously, I construed the term "characterized in that the B-mode image is displayed within said blood flow display region while said blood flow display region is moved" in claim 1 to mean "characterized in that the B-mode image is always displayed in place of the blood flow image within the blood flow display region while the blood flow display region is moved, and the blood flow image is never displayed within the blood flow display region while the region is moved."

The question is simple: do the accused products ever display blood flow while the region of interest is being moved? If they do, they cannot infringe. The undisputed facts

demonstrate that when a user of one of the accused products moves the region of interest, the blood flow image is not suppressed. Therefore, the existing blood flow image may appear within the region of interest while it is being moved and the accused products do not infringe.

However, plaintiffs contend that defendant's use of the "Color Suppress" function during testing of some of its product provides an alternative ground for finding infringement. Testing is a "use" of an invention that may infringe under 35 U.S.C. § 271(a). Waymark Corp. v. Porta Systems Corp., 245 F.3d 1364, 1366 (Fed. Cir. 2001). The "Color Suppress" function of the MicroMaxx and M-Turbo products causes the blood flow image to be suppressed. Therefore, it is possible that the accused products may infringe if they are used with the Color Suppress feature activated. However, plaintiffs cannot point to any specific evidence that infringement has occurred in this manner. The only evidence they cite for the proposition that defendants test their products by moving the region of interest while the Color Suppress function is active is a testing protocol that is more than 70 pages long and contains hundreds of one-line descriptions of tests that can be performed. It is not clear how often, when, or by whom these tests are performed. Therefore, it would be sheer speculation to conclude that infringement has occurred or is occurring.

Finally, plaintiffs argue that defendant's products infringe claim 1 by equivalence because they "steal the benefit of the invention" even if there is no literal infringement.

Neither side's argument or evidence on this point is especially compelling. Both parties rely heavily on conclusory expert testimony and rehash their literal infringement arguments.

The '294 patent says that the blood flow image is *never* shown in the region of interest while the region of interest is moved. Defendant's products do not block the display of blood flow, and blood flow *often* appears in the region of display while it is being moved. For plaintiffs to prevail, it was their burden to demonstrate that a function that "never" shows blood flow is substantially the same as a function that "often" does so and that defendant's products are therefore sufficiently similar to the invention disclosed in the '294 patent to allow a reasonable jury to find infringement. Because plaintiffs have failed to do that, they have failed to show infringement as a matter of law. Accordingly, I conclude that defendant is entitled to summary judgment with respect to claim 1 of the '294 patent.

Plaintiffs' argument with respect to claim 2 of the '294 patent fails for the same reason. Claim 2 of the patent is a means plus function claim that includes the term "display means." At claim construction, I found the associated function to be "which always displays the B-mode image in place of the blood flow image within the blood flow display region while the blood flow display is moved and never displays the blood flow image in the blood flow display region while the region is moved" and the structure to be "a circuit or micro-computer or the like with associated software, e.g., changers and a change controller." As discussed above, I conclude that the accused products do not "always displays the B-mode

image in place of the blood flow image within the blood flow display region while the blood flow display is moved and never displays the blood flow image in the blood flow display region while the region is moved." Accordingly, the products cannot infringe claim 2 of the '294 patent.

As to defendant's contention that the '294 patent is invalid, neither side suggests that there is '"a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant the issuance of a declaratory judgment.'" MedImmune Inc. v. Genentech, Inc., 127 S. Ct. 764, 771 (2007) (quoting Maryland Casualty Co. v. Pacific Coal & Oil Co., 312 U.S. 270, 273 (1941)).

As I noted in Silicon Graphics, Inc. v. ATI Technologies, Inc., 06-cv-611-bbc (W.D. Wis. Mar. 25, 2008), there is ample room for argument on the question whether a district court retains jurisdiction to decide claims for invalidity once all of the claims for infringement are dismissed. Compare Fort James Corp. v. Solo Cup Co., 412 F.3d 1340, 1348 (Fed. Cir. 2005) (holding that district court erred in determining that jury verdict of non-infringement divested district court of jurisdiction to hear unenforceability counterclaim) with Benitec Australia, Ltd. v. Nucleonics, Inc., 495 F.3d 1340, 1347 (Fed. Cir. 2007) (holding that district court determined correctly that it had been divested of jurisdiction to hear defendant's counterclaims for invalidity and unenforceability when plaintiff had voluntarily dismissed its infringement claims without prejudice before trial).

However, I concluded in Silicon Graphics that even if a court retains jurisdiction to decide issues of validity that are not tied to an actual controversy, it has discretion to dismiss those claims *before* trial, which is one way to reconcile the approaches of Fort James and Benitec. See also Cardinal Chemical Co. v. Morton International, Inc., 508 U.S. 83, 95 (1993) (in addressing motion for declaratory judgment district court has discretion in determining whether to exercise jurisdiction even when established). In this case, I am exercising my discretion not to retain jurisdiction over any invalidity challenge to a patent that is found not to have been infringed. Defendant's motion for summary judgment of invalidity as to the '294 patent will be denied.

III. PLAINTIFFS' UNITED STATES PATENT NO. 6,120,447

Plaintiffs contend that defendant's Micro-Maxx and M-Turbo products infringe claims 1 through 13 of the '447 patent. The parties agree about the function of the accused products and have filed cross-motions for summary judgment regarding infringement. Defendant has moved for summary judgment on the ground that its products do not infringe any of the asserted claims either literally or by equivalence because they store image data before the data are transmitted wirelessly. Plaintiffs have moved for summary judgment on the ground that defendant's products infringe the asserted claims directly and that defendant has induced infringement by others. Because I find that the accused products store image

data before the data are transmitted, I conclude that the products do not infringe the '447 patent. Accordingly, defendant's motion for summary judgment will be granted.

From the parties' proposed findings of fact, I find the following facts to be material and undisputed.

A. Undisputed Facts

United States Patent No. 6,120,447 (the '447 patent) is entitled "Ultrasound Image Data Wireless Transmission Techniques." The application that led to the '447 patent was filed on December 31, 1998 and issued on September 19, 2000.

1. Asserted claims

Claims 1 and 9 are the only independent claims of the patent. Claim 1 is an apparatus claim; claim 9 is a method claim.

Claim 1 discloses:

> 1. In an ultrasound imaging system for generating image data at a first location in response to scanning of a subject under study, improved apparatus for transmitting the data comprising in combination:

a computer connected to control the ultrasound imaging system;

a network interface connected to receive the image data from the computer;

a network transmit module coupled to the network interface connected to

wirelessly transmit the image data before storage;

a network receive module connected to receive the wirelessly transmitted image data at a second location remote from the first location;

a routing device connected to route the received image data; and

an asynchronous network for transmitting the received data via internet protocol, whereby image data generated by the ultrasound imaging system may be transmitted without wires to a network before storage.

Claim 9 discloses:

9. In an ultrasound imaging system for generating image data at a first location in response to scanning of a subject under study, an improved method of transmitting the data comprising in combination:

generating image data by scanning a subject under study;

transmitting the image data wirelessly using a network protocol from the first location before storage;

receiving the wirelessly transmitted image data at a second location different from the first location;

asynchronously transmitting the received image data using internet protocol, whereby the image data may be routed to a network before storage.

2. Operation of accused products

Defendant's MicroMaxx products are designed and operated to perform ultrasound imaging in one location and wirelessly transmit the generated image data to another location. Defendant's current M-Turbo products do not operate wirelessly. When using the

MicroMaxx products, an ultrasound operator moves the scanhead over the portion of a patient's body that she wishes to observe. The scanhead beams a series of ultrasound pulses into the body. For each pulse, a series of reflections bounce off internal body parts and return to the transducer, where they are converted into electronic signals. The electronic signals are captured and converted into a format known as "run length encoding."

Run length encoding is a "lossless" compression method, meaning that, if decompressed properly, the resulting image is exactly the same as the image before compression. The run length encoding data are stored on a flash memory internal to the system. A user can retrieve the data from the flash memory at a later time. The data can be transferred from the memory, converted to JPEG or similar format and transmitted to other computers, printers and storage devices. The run length encoding data must be stored in the flash memory before they are transmitted by any means. Data in JPEG format are not stored in the flash memory.

Flash memory is a common form of data storage used in numerous applications, including consumer products. Storing data in the flash memory before they are transmitted provides additional protection against loss of images or corruption of data during transfer. In addition, it can reduce bandwidth requirements for transmission. A technician may review the images before sending them and select a limited subset to transmit.

B. Opinion

The parties' sole dispute regarding the '447 patent relates to a relatively narrow question of claim construction. The claims of the '447 patent all include the limitation that "image data" are transmitted wirelessly from the location where the ultrasound scanning has taken place to a second location, where the data are stored. The relevant claim language discloses the step of "transmitting the image data wirelessly using a network protocol from the first location before storage." Although the parties disagreed initially about the proper construction of the term "before storage," they agreed at the claim construction hearing that the term could be construed properly as "before data is entered in memory from which it may be retrieved at a later time." Given the parties' agreement, this is the construction that I adopted.

Neither party requested a construction of the term "image data" in their claim construction briefs and I did not construe it at that time. A common understanding of the term would be "data related to an image." For the reasons discussed below with respect to plaintiffs' argument that storage means "archival storage," I conclude that there is no reason to depart from this plain language understanding of the term.

It is undisputed that in the accused products, data regarding the ultrasound scan are always stored in a local flash memory before they are retrieved, converted to JPEG or other

familiar image format and then transmitted.[1] Thus, the accused products store image data before transmission, rather than transmit this data before storage. On its face, such an operation falls outside the claimed step of "transmitting the image data wirelessly using a network protocol from the first location before data is entered in memory from which it may be retrieved at a later time." Therefore, it is not entirely surprising that plaintiffs seem to regret their agreement at the claim construction hearing. In an effort to avoid summary judgment, they now argue that "before storage" really means "before archival storage" and the "image data" that are transmitted before storage therefore must be in archival format (such as a JPEG). Although this belated request for reconsideration could be rejected on procedural grounds alone, the substance of plaintiffs' argument is unpersuasive.

The claims themselves do not hint that some kinds of storage would be permitted before transmission of image data. Instead, they are quite clear in setting out steps whereby transmission takes place first. Likewise, there is nothing in the very brief patent specification that lends support for limiting the claim language as plaintiffs would like it. Neither the word "archive" nor "permanent" appears anywhere in the specification. Instead, the

[1] Apparently, the current generation of defendant's M-Turbo products do not transmit information wirelessly. Plaintiffs maintain that they should still be included as "accused products" because defendant intends to release an M-Turbo product line this fall that provides for wireless transmission. Absent evidence that the M-Turbo products are infringing currently, this claim is not yet ripe.

specification touts the advantage of the provision of wireless transmission from the imaging system to a second location and storage device. In a last-ditch effort, plaintiffs attempt to introduce extrinsic evidence that hospital and health care protocol requires archival storage of ultrasound images and that this storage occurs at a location remote from the site of the original scan. I have no doubt that this is the case. However, there is no indication that this patent has anything to do with that longer term storage of image data. Because the accused products store image data before the data are transmitted, I conclude that the products cannot literally infringe any of the asserted claims.

The next question is whether there is evidence that the accused products infringe by equivalence. As an initial matter, I note that only defendant moved for summary judgment with respect to this theory of infringement. Plaintiffs assert that the pre-transmission storage of data in the accused products is substantially the same as the claimed method. However, I cannot consider plaintiffs' proffered evidence because they did not include in Mark Schafer's expert reports any of the opinions on which they now attempt to rely. Instead, his opinions regarding the '447 patent and the doctrine of equivalents were first presented to support plaintiffs' opposition to defendant's motion for summary judgment. As discussed in greater detail below at pp. 55-56 with respect to plaintiffs' motion to strike a late-disclosed expert opinion filed by defendant, I have disregarded such opinions and any proposed facts supported only by these opinions. Therefore, I find that plaintiffs have failed

to adduce any admissible evidence that defendant's products infringe the '447 patent by equivalence.

Because the products do not directly infringe any of the asserted claims, their use by defendant's customers cannot give rise to a claim of induced infringement either. Therefore, defendant's motion for summary judgment will be granted with respect to plaintiffs' claims that defendant infringes claims 1 through 13 of the '447 patent literally or by equivalence and plaintiffs' cross motion will be denied.

IV. PLAINTIFFS' UNITED STATES PATENT NO. 6,102,859

Plaintiffs have accused defendant's MicroMaxx, Titan, M-Turbo and S-Series ultrasound systems of infringing claims 1, 7, 8 and 10 of the '859 patent. Defendant has moved for summary judgment on the grounds that the accused products do not infringe the '859 patent and that the asserted claims are invalid. Because I conclude that the accused products do not infringe the asserted claims either literally or by equivalence, defendant's motion will be granted on this ground. It is not necessary to reach defendant's invalidity challenge for reasons discussed above at pages 16-17.

Before turning to the undisputed facts with respect to the '859 patent, a brief word regarding their origin is necessary. Several of plaintiffs' affirmative proposed findings of fact, see, e.g., PPFOF #240, dkt. #288 at 33, and their responses to defendant's proposed

findings of fact are impossible to evaluate because they are phrased in terms of what their expert believes. For example, plaintiffs' proposed finding of fact number 240 begins "According to Dr. Burns . . . ." What plaintiffs' expert testified to in his expert report or in a deposition is not relevant to the claims in this case. If plaintiffs wanted to propose the underlying statements as fact, they could have done so and cited the appropriate evidence. The manner in which plaintiffs proposed these facts makes it impossible for the court to parse their meaning or for defendant to respond appropriately. Defendant recognized this error and disputed the problematic facts on this ground only. Accordingly, I have disregarded all of the facts so proposed.

From the parties' proposed findings of fact, I find the following facts to be material and undisputed.

A. Undisputed Facts

United States Patent No. 6,102,859 (the '859 patent) is entitled "Method and Apparatus for Automatic Time and/or Lateral Gain Compensation in B-Mode Ultrasound Imaging." The patent application that led eventually to the '859 patent was filed on December 1, 1998. The patent issued on August 15, 2000.

1. Asserted claims

Claim 1 is an apparatus claim and is independent. It discloses:

1. A system for imaging biological tissues, comprising:

an ultrasound transducer array comprising a multiplicity of transducer elements;

a transmit beamformer for pulsing said transducer array to transmit ultrasound beams in first and second scans;

a receive beamformer for forming receive beams of acoustic data derived from echo signals detected by the transducer array subsequent to said transmissions;

a signal processing chain for converting said acoustic data into first and second image frames of pixel intensity data corresponding to said first and second scans respectively, said signal processing chain comprising a gain compensation component for adjusting the gain of the acoustic data as a function of gain adjustments;

a computer programmed to determine said gain adjustments as a function of said first image frame of pixel intensity data and the current settings of all pertinent gain-related system parameters in accordance with a noise model, and transmit said gain adjustments to said gain compensation component in time to adjust the gain of the acoustic data acquired from said second scan;

a video processor for converting said image frame of pixel intensity data into an image frame of gray-scale level data; and

a display device for displaying an image representing said image frame of gray-scale level data, wherein said computer is programmed to perform the following steps:

> (a) dividing said first image frame of pixel intensity data into a regular grid of kernels forming a plurality of rows;
> (b) retrieving the current settings of all pertinent gain-related parameters for each kernel;
> (c) predicting the mean noise level in each kernel using said

noise model;
(d) calculating the mean pixel intensity for each kernel;
(e) comparing the predicted mean noise level with the calculated mean pixel intensity for each kernel;
(f) for each row satisfying a predetermined condition, determining a mean pixel intensity of all kernels having signal to form a row mean;
(g) based on an optimal mean gray-scale level, determining the gain adjustment for each row which will shift the gray-scale level corresponding to the respective row mean to said optimal gray-scale level; and
(h) sending said gain adjustments to said gain compensation component.

Claim 7 is a method claim and is independent. Claims 8 and 10 depend from claim 7. Claim 7 discloses:

> 7. A method for automatically adjusting gain in an ultrasound imaging system, comprising the steps of:
>
> (a) dividing an image frame of pixel intensity data into a regular grid of kernels forming a plurality of sets of aligned kernels;
>
> (b) retrieving the current settings in said ultrasound imaging system of all pertinent gain-related parameters for each kernel;
>
> (c) predicting the mean noise level in each kernel using a noise model;
>
> (d) calculating a function of the pixel intensity for each kernel;
>
> (e) comparing the predicted mean noise level with the calculated pixel intensity function for each kernel;
>
> (f) for each kernel set satisfying a predetermined condition, determining a mean pixel intensity of all kernels having signal to form a kernel set mean;

(g) based on an optimal mean gray-scale level, determining the gain adjustment for each kernel set which will shift the gray-scale level corresponding to the respective kernel set mean to said optimal gray-scale level; and

(h) adjusting the gain in accordance with said gain adjustments during subsequent operation of said ultrasound imaging system.

2. Background information

When an ultrasound wave is reflected from tissues deep within the body, the resulting signals are often attenuated and unclear or "noisy." The "noise" may be exacerbated by noisy electronics components in the ultrasound system. One way to compensate for this attenuation and noise is to provide rotary dials on the ultrasounds system that allow a sonographer to make manual adjustments in the sensitivity of the system to incoming signals. By turning down the sensitivity appropriately, a sonographer can improve the characteristics of the display image, thereby compensating for the attenuation and noise. However, not all sonographers have the knowledge or time to adjust the dials appropriately. The prior art includes techniques for automating compensation for attenuation. The '859 patent discloses a technique for compensating automatically for both attenuation and noise.

3. The accused products

The accused products use a "low threshold value" to maximize image quality. For

each product, this threshold is set by an engineer for defendant, who works with a sonographer to scan a volunteer patient and make a visual determination of the setting that maximizes image quality. Different values of the threshold value are tried until the desired performance is achieved. Using this iterative, trial-and-error method, the engineer and sonographer test multiple values and use their experience in detecting optimal image quality on the screen to set a particular threshold.

The accused products contain a computer and an "ARM Processor," which is programmed to determine gain adjustments based on an algorithm. The ARM Processor contains software that provides an "Auto-Gain feature." Defendants' Software Design Specification sets forth "processing steps [that] are taken to adjust the [gain] settings" of the device.

B. Opinion

Defendant has moved for summary judgment on several grounds. First, it contends that the accused products cannot infringe independent claims 1 or 7 of the '859 patent because they do not perform several of the specific steps disclosed in the patent. In addition, it contends that the asserted claims are invalid as anticipated. Because I conclude that the accused products do not "predict[] the mean noise level in each kernel using said noise model" and do not infringe the '859 patent either literally or by equivalence, I need not

consider defendant's other arguments.

As noted above, the advantage disclosed in the '859 patent is the ability to automatically correct for "noise," or lack of clarity, on the display image. The patent discloses a series of steps for achieving this result. Relevant to this discussion are the limitations in claim 1 that "said computer is programmed to perform the following steps . . . predicting the mean noise level in each kernel using said noise model" and the disclosure of claim 7 "A method for automatically adjusting gain in an ultrasound imaging system, comprising the steps of . . . predicting the mean noise level in each kernel using said noise model."

Once again, the parties agree about how the accused products function. They agree that an engineer and sonographer use visual trial-and-error to set a "threshold" that excludes certain "noisy" pixels from the display. Plaintiffs contend that the process of setting this threshold constitutes the use of a noise model and that a computer using the threshold to sort and exclude pixels containing too much noise is "predicting the mean noise level in each kernel using said noise model." Both arguments are unpersuasive.

At claim construction, the parties disagreed about the meaning of a "noise model." At that time, I declined to construe the phrase, but observed that the parties agreed that "a 'model' in this context is a construct that is used for the purpose of prediction and that, in this case, a noise model predicts noise statistics." The admittedly trial-and-error approach

used to set the threshold in the accused devices is not a "construct" of any sort. Rather, it is a hands-on, experience-based effort by individuals to set a particular value for each product below which data should be excluded from the display because they are insufficiently clear. Setting a threshold in this iterative manner is practically the opposite of using a model to set the threshold.

Plaintiffs' argument that the accused products infringe by equivalence fails for a similar reason. In the accused devices, noisy pixels are screened out by a human-set threshold. Their mean noise level is not predicted using a noise model. Plaintiffs argue that the overall result is similar to the patented method because both the accused products and disclosed steps result in "a better image in terms of contrast and brightness." This broad statement flies in the face of the legal standard for the doctrine of equivalents. As noted above, infringement by equivalence occurs when "the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention." Warner-Jenkinson Co., 520 U.S. at 40. Although the result may be similar, setting a threshold by trial and error and then using this threshold to exclude some data values does not produce this result in substantially the same way as using a computer to predict values using a noise model.

V. PLAINTIFFS' UNITED STATES PATENT NO. 6,418,225

Plaintiffs contend that defendant's MicroMaxx and M-Turbo ultrasound systems infringe claims 7-8, 19, 21 and 27-30 of the '225 patent. Defendant has moved for summary judgment on the grounds that all of the asserted claims of the '225 patent are invalid and some of the asserted claims are not infringed by the accused products. Because a reasonable jury could conclude that the accused products allow a user to perform the method disclosed in claims 27 and 28, defendant's motion as to infringement will be denied. However, defendant has shown by clear and convincing evidence that the asserted claims of the '225 patent were anticipated by a prior patent patent, U.S. Patent No. 6,490,684. Therefore, defendant's motion will be granted as to invalidity.

A. Undisputed Facts

1. Asserted claims

United States Patent No. 6,418,225 (the '225 patent) is titled "Method and Apparatus for Feature Configuration in Remotely Located Ultrasound Imaging System." The patent was filed on February 5, 2001 and issued on July 9, 2002. The parent patent application to the '225 patent was filed on April 23, 1998. The '225 patent discloses methods for enabling optional features and disabling previously enabled features.

Claim 7 is an independent claim, which discloses:

7. An ultrasound imaging system comprising:

an ultrasound transmitter for transmitting ultrasound energy into a volume of ultrasound scatterers;

a signal processing chain for acquiring display data representing an image of ultrasound scatterers in said volume in accordance with a system configuration comprising enabled features, said display data being based on ultrasound energy scattered by said ultrasound scatterers;

a monitor for displaying said image in response to receipt of said display data;

a memory for storing a system configuration database representing said enabled features of said system configuration;

an operator interface comprising a plurality of keys for inputting data into said system;

means for placing said system in a feature key entry mode in response to a predetermined command input via said operator interface; and

decrypting means for outputting decrypted data in response to depression of a sequence of keys of said operator representing an encrypted feature key comprising an encrypted validation identifier and an encrypted option identifier, said decrypted data comprising a decrypted validation identifier and a decrypted option identifier;

validating means for determining if said decrypted validation identifier is valid; and

means for altering said system configuration as a function of said decrypted option identifier only if said decrypted validation identifier is valid.

8. The system as defined in claim 7, wherein said change in system configuration is addition of an optional feature.

19. A method for configuring a computerized system, comprising the following steps:

booting said computerized system with a system configuration wherein only those optional computer features which are identified in a list of activated optional computer features listed in a system configuration database stored in system memory are activated;

inputting a command via an operator interface which causes said computerized system to enter a feature activation mode;

inputting an encrypted feature key into said computerized system via said operator interface while said computerized system is in said feature activation mode, said encrypted feature key comprising an encrypted validation identifier and an encrypted optional computer feature identifier, wherein said encrypted optional computer feature identifier corresponds to an optional computer feature not identified in said list of activated optional computer features;

automatically decrypting said feature key inputted via said operator interface to form decrypted data comprising a decrypted validation identifier and a decrypted optional computer feature identifier;

automatically comparing said decrypted validation identifier with a stored validation identifier in said system configuration database; and

automatically adding said decrypted optional computer feature identifier to said list of activated computer features in said system configuration database if said decrypted validation identifier matches said stored validation identifier.

21. The method as recited in claim 19, wherein said encrypted feature key further comprises an encrypted expiration date, said decrypted data derived from said feature key further comprises a decrypted expiration date, and said adding step further comprises associating said decrypted expiration date with said decrypted optional computer feature identifier in said list of activated computer features in said system configuration database.

27. A method for configuring a computerized system, comprising the steps of:

pre-storing an option and an activation status datum in said system, said

activation status datum having a first value indicating that said option should not be activated when said system is booted;

transmitting data comprising an option identifier identifying said option and a machine identification number identifying said system from a remote location to a central location;

at said central location, receiving said data, adding a key identifier to said data, encrypting said key identifier and said data to form an encrypted feature key, and transmitting said encrypted feature key to said remote location;

inputting said encrypted feature key into said system via an operator interface;

inside said system, automatically performing the following steps:

decrypting said encrypted feature key inside said system to form decrypted data comprising said key identifier, said option identifier and said machine identification number;

validating said key identifier and said machine identification number resulting from decryption; and

changing said activation status datum from said first value to a second value if said key identifier and said machine identification number are valid, said second value indicating that said option should be activated when said system is booted.

28. A method for configuring a computerized system, comprising the steps of:

pre-storing an option and an activation status datum in said system, said activation status datum having a first value indicating that said option should be activated when said system is booted;

transmitting data comprising an option identifier identifying said option and a machine identification number identifying said system from a remote location to a central location;

at said central location, receiving said data, adding a key identifier to said data, encrypting said key identifier and said data to form an encrypted feature key, and transmitting said encrypted feature key to said remote location;

inputting said encrypted feature key into said system via an operator interface; and

inside said system, automatically performing the following steps:

decrypting said encrypted feature key to form decrypted data comprising said key identifier, said option identifier and said machine identification number;

validating said key identifier and said machine identification number resulting from decryption; and

changing said activation status datum from said first value to a second value if said key identifier and said machine identification number are valid, said second value indicating that said option should not be activated when said system is booted.

29. A system comprising:

an operator interface;

memory storing an option, an option identifier identifying said option, and an activation status datum, said activation status datum having either first or second values, said first value indicating that said option should not be activated when said system is booted and said second value indicating that said option should be activated when said system is booted; and

a computer programmed to perform the following steps in an option activation mode:

detecting entry of an encrypted feature key via said operator interface:

decrypting said encrypted feature key to form decrypted data;

verifying that said decrypted data comprise a valid key identifier and a valid machine identification number; and

after verification, changing said activation status datum from one of said first and second values to the other of said first and second values if said decrypted data comprise said option identifier.

30. The system as recited in claim 29, wherein said system is an ultrasound imaging system.

2. Operation of the accused products

Defendant concedes that it performs all but one step of the method disclosed in claims 27 and 28 of the '225 patent. Defendant tests the accused products; during these tests it uses a license key, or option identifier, and a machine identification number.

Defendant distributes a MicroMaxx System user guide with each MicroMaxx product. The user guide tells defendant's customers to contact defendant to obtain a license key and tells the user to transmit to defendant the name of the feature to be activated, the serial number of the machine on which the feature is to be activated, the software version of the system and the circuit board number of the system.

Defendant uses a licensing system incorporating a 50-hour grace period that attaches to all features of every accused product. Upon the expiration of the grace period, the product is designed to disable further use of the product until a valid license key is obtained and entered. Defendant encrypts the license key.

3. Other patents

For the last two decades, vendors of data-processing devices have known how to configure systems for shipping so that some available features are not enabled. This allows them to offer a single product that can be upgraded by activating previously disabled features using remote computer commands. In 1991, U.S. Patent No. 5,965,505 (the '505 patent) described a method that included storing in memory a number of applications programs, at least one of which included at least one optional feature. Optional features stored in memory have long been distributed with encryption or other means of preventing authorized use of the features.

United States Patent No. 6,490,684 (the '684 patent) is entitled "Ultrasound Method and System for Enabling an Ultrasound Device Feature." It was filed on March 31, 1998 and issued on December 3, 2002. As the title suggests, the '684 patent discloses a method for enabling ultrasound features through the use of a key that may be encrypted. The specification for the '684 patent explains that the "key can be in the form of alphanumeric symbols that can be supplied to the user in writing, over the phone, via email, or via facsimile."

The '684 patent specification explains that the user selects the feature on the ultrasound system to be enabled and enters the key via the key receiver. A feature control manager "determines which features are enabled and disabled and presents this information

to the user." Next, the '684 patent discloses the use by an operator of a keyboard, optical scanner, magnetic disc drive or voice recognition device to input into the system data, including the key used to activate optional features. A keyboard contains a "plurality of keys for inputting data into said system." The system may then decrypt the key. If the decrypted key is valid, the feature control manager generates a command to the ultrasound device application to enable the use of the feature. If the feature key is invalid, an error message is sent to the application and the application will continue to operate as if the feature is not available to the user.

The '694 patent includes two figures that describe different embodiments. In one, a key is sent to a user, who then selects a feature to be enabled and enters the key. In the other, a user selects the feature to be entered and the key is transmitted to the ultrasound system through a "key receiver" such as a network link or modem. The specification states that, in one preferred embodiment, a key is sent from the vendor to the user and the key "comprises information that is unique to the ultrasound device . . . and a code that is unique to a corresponding feature."

Plaintiffs did not disclose neither the '684 patent or the '505 patent during the prosecution of the '225 patent.

B. Opinion

1. Infringement

Defendant has moved for summary judgment on the ground that it does not infringe claims 27-28 of the '225 patent because it does not perform one of the steps of the claimed method. Specifically, defendant asserts that it does not infringe claims 27 and 28 because it never activates or deactivates optional features itself and thus does not perform the step of "transmitting data comprising an option identifier identifying said option and a machine identification number identifying said system from a remote location to a central location."

Plaintiffs have adduced some evidence that defendant tests its own products and, in doing so, "transmit[s] data comprising an option identifier identifying said option and a machine identification number identifying said system." As noted above, testing is a "use" of an invention that may infringe under 35 U.S.C. § 271(a). Waymark Corp., 245 F.3d at 1366. However, plaintiffs have adduced no evidence that, in the course of defendant's tests, information is sent from a "remote location" to "a central location," as required by the claim language. Therefore, plaintiffs have failed to adduce evidence from which a jury could conclude that defendant directly infringes claims 27 and 28 when it tests the accused products.

The next question is whether a reasonable jury could conclude that defendant induces infringement of these claims by instructing its customers to transmit requests to activate options on their ultrasound systems. The court of appeals has held on a number of occasions

that instructing customers on the performance of a patented method may qualify as active inducement under § 271(b). Metabolite Laboratories, Inc. v. Laboratory Corp. of America Holdings, 370 F.3d 1354, 1365 (Fed. Cir. 2004); Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 1272 (Fed. Cir. 1986).

As noted above, the parties agree that the only step disclosed in claims 27 and 28 that is not performed by defendant's products is "transmitting data comprising an option identifier identifying said option and a machine identification number identifying said system from a remote location to a central location." Defendant's user guide for its MicroMaxx products instructs customers to contact defendant to obtain a "license key" for features that have not been activated. Further, it instructs them to transmit the name of the feature, or option, to be activated and the serial number of the machine on which the feature is to be activated. It is reasonable to infer that defendant's customers send these requests to defendant from a remote location. Moreover, some features enabled during a grace period may be disabled until the customer contacts defendant for a valid license key. Because defendant's product performs all but one step of the method disclosed in claims 27 and 28 and defendant's user guide for the MicroMaxx products instructs customers to perform the final step, a reasonable jury could conclude that defendant induces infringement of these claim terms. Therefore, I must consider defendant's argument that the asserted claims of the '225 patent are invalid.

2. Validity

Patents are presumptively valid. 35 U.S.C. § 282. A party challenging the validity of a patent has the burden to make its showing by clear and convincing evidence. Connell v. Sears Roebuck & Co., 722 F.2d 1542, 1549 (Fed. Cir. 1983). A patent claim is invalid as anticipated under 35 U.S.C. § 102(b) if the claimed invention was patented or described in a printed publication more than one year prior to the date of the application for patent in the United States. A patent claim is invalid as anticipated under 35 U.S.C. § 102(e) if the claimed invention was described in a patent by another for which the United States application was filed before the date of invention by the applicant for the patent at issue.

Anticipation is a question of fact: whether "all aspects of the claimed invention were already described in a single reference." Scripps Clinic & Research Foundation v. Genentech, Inc., 927 F.2d 1565, 1576-77 (Fed. Cir. 1991). Generally, the facts relevant to this finding are the reference claimed to be prior art and evidence of what the reference meant to persons of ordinary skill in the field of the invention. Id. Summary judgment on invalidity is appropriate when there are no material facts in dispute and the movant has established invalidity by clear and convincing evidence. Helifix Ltd. v. Blok-Lok, Ltd., 208 F.3d 1339, 1346 (Fed. Cir. 2000); Oney v. Ratliff, 182 F.3d 893, 895 (Fed. Cir. 1999) ("summary judgment is inappropriate if a trier of fact applying the clear and convincing standard could find for either party"). The anticipation inquiry proceeds on a claim-by-claim

basis. Sinisar Corp. v. DirectTV Group, Inc., 523 F.3d 1323, 1334 (Fed. Cir. 2008).

When addressing the question of anticipation, the court must begin with construction of the patent's claims. Datamize, LLC v. Plumtree Software, Inc., 417 F.3d 1342, 1348 (Fed. Cir. 2005). Next, the court must determine whether a prior art reference discloses each and every limitation of the claim expressly or inherently. Scripps Clinic & Research Foundation, 927 F.2d at 1576-77. Prior art anticipates a method claim if it discloses all of the operative steps of the method. Schumer v. Laboratory Computer Systems, Inc., 308 F.3d 1304, 1309 n.3 (Fed. Cir. 2002).

Defendant contends that claims 7-8, 19, 21 and 27-30 of the '225 patent are rendered invalid by United States Patent Nos. 6,490,684 and 5,956,505. Alternatively, defendant contends that records of the inventive process related to the '684 patent render the '225 patent invalid. I turn first to defendant's contention that the '684 patent anticipates the '225 or renders it obvious. As with many disputes regarding validity, the threshold question is whether the cited patents constitute prior art, that is, information that was in the public domain before the patentee filed its patent application or completed its invention. Plaintiffs attempt to establish that the invention disclosed in the '225 patent was conceived of before the '684 patent application was filed on March 31, 1998, and therefore, that the '684 patent does not constitute prior art.

The date of invention of a patent is presumed to be the filing date of the application.

Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 449 (Fed. Cir. 1986). To overcome the presumed date of invention and establish an earlier date, plaintiffs must offer evidence sufficient for a jury to find that the subject matter of the '225 patent was invented on that earlier date. Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1576-77 (Fed. Cir. 1996).

The rules for establishing a date of invention earlier than the filing date have been borrowed from 35 U.S.C. § 102(g), the basic rule for determining priority. Mahurkar, 79 F.3d at 1577. An earlier invention date may be established on a showing that before the filing of an application, an invention was either (1) reduced to practice or (2) conceived of before reasonable diligence was exercised to reduce it to practice. Id. An invention is considered to have been "conceived of" when an inventor has "formed in his or her mind a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice." Id. (citations omitted).

The only two facts that plaintiffs proposed to establish an earlier date of invention were presented improperly and cannot be considered. The first begins: "GE has provided interrogatory answers and documents that show conception of the claimed '225 invention no later than November of 1997. . . ." The second states that "One of the '225 inventors, Mr. Johnson, also testified that the conception of the '225 invention occurred prior to the . . . filing date of the '684 patent." The "facts" that interrogatories included a certain

statement or that the inventor testified about a particular issue are irrelevant to the underlying question, which is, on what date was the invention conceived? Therefore, I conclude that plaintiffs have failed to meet their burden to show that conception of the '225 patent occurred before the filing date of the '684 patent and I will consider the '684 patent to be prior art.

On their faces, the '684 and '225 patents are strikingly similar. Among other things, both disclose methods and apparatuses for enabling previously disabled optional features in an ultrasound system. In fact, plaintiffs concede that many of the elements of the '225 patent are included in the '684 patent. However, they argue that the asserted claims are not invalid because the following terms found in those claims are not included in the '684 patent. (1) the "option identifier" included in claims 7, 27 and 28; (2) the entry of a key "via an operator interface" included in claims 7, 8, 19, 21, 27 and 28; (3) the "feature activation mode" included in claims 19 and 21; and (4) the key comprising a "key identifier" included in claims 27-30. I will consider each in turn.

a. "Option identifier"

As noted above, claims 7, 27 and 28 disclose the use of an "option identifier." During claim construction, I construed "option identifier" to mean "alphanumeric data representing the option to be activated." As an initial matter, I note that the specification for the '684

patent explains that the "key can be in the form of alphanumeric symbols that can be supplied to the user in writing, over the phone, via email, or via facsimile."

Plaintiffs assert that in the "local" method of activating an option disclosed in the '684 patent, the user requests a key before specifying which feature is to be activated and in the "remote" method, a user never enters the key herself. Therefore, plaintiffs argue, the key requested and entered by the user cannot be specific to the option to be activated. This may be true for those preferred embodiments. However, there is no indication that the '684 patent is limited to those embodiments. In fact, the specification suggests otherwise. It explains that, in one preferred embodiment, a key is sent from the vendor to the user and the key "comprises information that is unique to the ultrasound device . . . and a code that is unique to a corresponding feature." This key comprised of "alphanumeric symbols" that are "unique to a corresponding feature" is indistinguishable from the "alphanumeric data representing the option of be activated."

b. Entry of a key "via an operator interface"

The term "via an operator interface" appears in terms 7, 8, 19, 21, 27 and 28. Plaintiffs' argument regarding this term is the same as their argument about "option identifier" and will be rejected for the same reasons. The '684 patent discloses that a user or operator may enter an alphanumeric key via a key receiver and that this key receiver may

be a keyboard. This is precisely the method disclosed in the asserted claims.

c. "Feature activation mode"

Claims 19 and 21 include a limitation of a "feature activation mode." At claim construction, the parties disagreed about the proper construction of this term. Defendant now supports plaintiffs' proposed construction: "a mode in which aspects of the system can be made active." Given their apparent agreement, I will adopt this construction as well. It is undisputed that the '684 patent discloses activation of a "feature control manager" when a user wishes to input the information regarding the optional feature to be enabled (either locally or remotely). The feature control manager presents information to the user about which features are enabled or disabled. After a key has been entered, the feature control manager activates the optional feature. Thus, the mode in which the system operates while the feature control activates options constitutes "a mode in which aspects of the system can be made active."

d. "key identifier"

The term "key identifier" appears in claims 27-30. The specification for the '225 patent explains that a "key identifier" is "a special code used to identify a valid feature key." The specification for the '684 patent states that, in one preferred embodiment, a key is sent

from the vendor to the user and the key "comprises information that is unique to the ultrasound device . . . and a code that is unique to a corresponding feature." The parties do not dispute that this "information" is a "code." Therefore, I conclude that the '684 patent discloses this element as well.

No reasonable jury could find that the '684 patent does not disclose every limitation included in the asserted claims of the '225 patent. Therefore, I must conclude that the '225 patent is invalid as anticipated. Accordingly, defendant's motion will be granted on the ground of invalidity.

PATENTS OWNED BY DEFENDANT

I. DEFENDANT'S UNITED STATES PATENT NO. 6,471,651

Defendant asserts that plaintiffs' Vivid i, Voluson i and Voluson e products infringe claim 1 of the '651 patent. Plaintiffs have filed a motion for summary judgment with respect to the '651 patent, in which they contend that they do not infringe claim 1. Because defendants have failed to adduce evidence that plaintiffs themselves directly infringe or that they induce others to infringe the method disclosed in claim 1 of the '651 patent, plaintiffs' motion will be granted.

From the parties' proposed findings of fact, I conclude that the following facts are material and undisputed.

A. Undisputed Facts

United States Patent No. 6,471,651 (the '651 patent) is titled "Low Power Portable Ultrasonic Diagnostic Instrument." It relates to a method of operating a portable ultrasound device at a reduced power consumption level.

Claim 1 of the '651 patent discloses:

> 1. In a portable ultrasonic diagnostic instrument having ultrasound transducers for transmitting and receiving ultrasonic waves and beamforming circuitry for focusing transmitted and received waves, a method of operating the instrument at a reduced power consumption level comprising the steps of:
>
> a) providing a battery source of electrical current for circuitry in the instrument, and
>
> b) selectively altering circuitry functions depending on mode of operation of the instrument when a first power limit is reached, thereby reducing power consumption.

Plaintiffs' marketing materials regarding the Vivid i state that, among other features, the product line includes "fast system boot-up" and that the products provide a "portable and wireless design." Plaintiffs' marketing materials regarding the Voluson i state that "StandBy Mode" is one of the "System Standard Features." Marketing materials regarding the Vivid i and Voluson i list "battery operation" as one of the products' features. Plaintiffs are leaders in the market for compact ultrasound equipment.

B. Opinion

Before turning to the substantive disputes regarding the '651 patent, I note that in its opposition brief, defendant invokes Fed. R. Civ. P. 56(f) and argues that it requires more discovery before it can respond to plaintiffs' motion for summary judgment. Defendant says it needs information relating to the use of plaintiffs' products by others, as well as plaintiffs' own use and testing of its products. The deadlines in this case were already pushed back once and the court resolved an earlier discovery dispute in January. Therefore, it is difficult to imagine why defendant waited so long to raise this issue or obtain discovery on these matters. If it was denied critical discovery, it could have filed an additional motion to compel. It did not, and it is far too late in the game for it to raise this issue.

Next, there are two issues central to the parties' dispute regarding the '651 patent. First, the parties disagree whether, as a matter of claim construction, the term "power limit," relates to a specific threshold measured in watts. Second, plaintiffs assert that defendant has no evidence of direct or indirect infringement.

When I construed the disputed terms of the '651 patent, I construed "reduced power consumption level" to mean "no more than 25 watts of electrical power"; I determined that "power consumption" is measured in watts. In addition, I construed "mode of operation" to mean "manner of operation characterized by a particular range of power conservation or power consumption." I declined to adopt either side's proposed construction of the phrase "selectively altering circuitry functions depending on mode of operation of the instrument

when a first power limit is reached, thereby reducing power consumption."

Plaintiffs contend that the term "power limit" must be measured in watts because I determined at claim construction that the phrase "operating the instrument at a reduced power consumption level," which is included in the preamble to claim 1, means "operating the instrument on no more than 25 watts of electrical power." Defendant argues that "power limit" should not be so limited. Although I am inclined to agree with defendant that neither the specification nor the court's prior construction of the preamble to the claim language supports limiting the term "power limit" to a threshold measured in watts, I need not decide this question because, even if I were to adopt the construction defendant advances, it has failed to adduce any evidence of direct or indirect infringement.

Claim 1 of the '651 patent describes a *method* for operating a portable ultrasound device at a reduced power level, rather than a device itself. Although defendant identifies its theory of infringement as "direct infringement" only, it appears to be arguing both that plaintiffs' own use constitutes direct infringement and that plaintiffs' sale of the accused products, along with instructions for use, induces third parties to infringe the '651 patent when those customers use the accused products.

Because claim 1 is a method claim, to prove direct infringement, defendant must be able to show that plaintiffs have performed each step of the disclosed method. Joy Technologies, Inc. v. Flakt, Inc., 6 F.3d 770, 775 (Fed. Cir. 1993); See also NTP, Inc. v.

Research In Motion, Ltd., 418 F.3d 1282, 1321 (Fed. Cir. 2005) (finding it unnecessary to decide whether method claims may be infringed under the 'sells' and 'offers to sell' prongs of section 271(a) but acknowledging that "Congress has consistently expressed the view that it understands infringement of method claims under section 271(a) to be limited to use." Id.). Defendant concedes that it has no evidence of plaintiffs' own use of the products. Instead, it appears to argue that plaintiffs are liable for inducing infringement because they "tout" features of their products that result in their customers using the patented method.

Under § 271(b), a party is prohibited from "actively induc[ing] infringement of a patent." A patent holder seeking to recover under this provision must prove two things: (1) direct infringement by a third party; and (2) "a certain level of intent on the part of the alleged inducer that the patent be infringed." Insituform Technologies, Inc. v. Cat Contracting, Inc., 385 F.3d 1360, 1377-78 (Fed. Cir. 2004).

With respect to acts of direct infringement, defendant asserts that there is circumstantial evidence that unidentified customers use the accused products in an infringing manner. They argue that this must be true because plaintiffs sell a lot of products and it is reasonable to infer that at least some of its customers use the products in an infringing manner. Circumstantial evidence can support a finding of infringement. Golden Blount, Inc. v. Robert H. Peterson Co., 438 F.3d 1354, 1362 (Fed. Cir. 2006). According to defendant, direct infringement occurs anytime someone operates one of the accused products

from battery power in such a way that the product reduces its power consumption or switches into a power-saving mode after the battery reaches a critical power level. Defendant argues that it is implausible that none of plaintiffs' customers has ever operated the accused devices in this way. Given plaintiffs' market share and apparent value of operating plaintiffs' products on battery power and in power-saving modes, I agree that defendant's argument is not entirely implausible. But I need not resolve this debate either, because defendant has failed to meet its burden regarding intent.

The standard for intent leaves something to be desired in terms of clarity: "a certain level of intent" is not exactly self-defining. The central question appears to be whether the patent holder must prove only that the defendant knew of the *acts* that cause infringement or whether the patent holder must also prove that the defendant knew or should have come to the legal conclusion that its acts would cause infringement. Insituform, 385 F.3d at 1377-78. The parties do not discuss this lack of clarity in the law but it is unnecessary to resolve it in this case because defendant has failed to meet either standard.

The Court of Appeals for the Federal Circuit has held that intent to induce infringement may be inferred only when the alleged infringer knowingly took "active steps" to bring about the infringing acts. Tegal Corp. v. Tokyo Electron Co., 248 F.3d 1376, 1379 (Fed. Cir. 2001) ("'Actively inducing,' like 'facilitating,' requires an affirmative act of some kind."). Defendant proposes as fact that plaintiffs "tout" the very features that result in

infringing use by its customers. Actively promoting particular aspects of a product that lead a customer to use a product in an infringing manner may support a finding of intent. E.g., Metabolite Laboratories, Inc. v. Laboratory Corp. of America Holdings, 370 F.3d 1354, 1365 (Fed. Cir. 2004). But defendant has overstated the evidence it cites: the alleged "touting" is actually just the listing of the features, among many others, on specification sheets that do not instruct the customer to perform a particular method or explain how to do anything. They simply say that some of plaintiffs' products include a standby features and can be operated on battery power. To say that this information "induced" customers to perform the patented methods would rob the term of any meaning. Defendant's motion for summary judgment will be granted as to this patent.

II. DEFENDANT'S UNITED STATES PATENT NO. 6,364,839

Defendant contends that plaintiffs' Vivid i ultrasound system and the 3V probe infringe claims 1 through 4, 11, 14, 15 and 18 of the '839 patent when used in combination. Plaintiffs have moved for summary judgment on the grounds that the accused products do not infringe the asserted claims because the associated probe does not store in memory software and data necessary for its use and the asserted claims of the '839 patent are invalid as obvious. Because I find that defendant has failed to adduce evidence that the 3V probe stores software necessary to its use, plaintiffs' motion for summary judgment on the ground

of non-infringement will be granted. Plaintiffs' motion for summary judgment on the ground of invalidity will be denied and its claim dismissed without prejudice.

Before turning to the merits of plaintiffs' motion, I note that the parties disagree about which facts the court should consider. In its response to plaintiffs' motion for summary judgment, defendant uses facts supported by a new declaration of one of its experts, Dr. Kenneth Bates. This declaration was filed well outside the time provided by the court for the submittal of expert opinions. Plaintiffs have moved to "strike" several paragraphs of Bates's declaration on the ground that they represent an untimely expert report. Defendant argues that it was necessary to submit this new evidence because plaintiffs had not provided it with the source code on which Bates's opinion is based before the deadline for filing expert reports had passed. It argues also that the opinions expressed in Bates's newly filed expert report are simply elaborations on points he made in his original report. Not so. Bates's original infringement report contained three conclusory paragraphs regarding the relevant limitations in the '839 patent. His new report covers the same general topics, but includes a substantial number of new details.

If defendant was not getting critical information in discovery, it could have filed a motion to compel. Alternatively, it could have sought leave to file a supplement to Bates's original report. It did neither. In cases in this district, discovery continues well beyond the deadline for filing expert reports, and indeed beyond the deadline for filing dispositive

motions. The fact that discovery ends after these deadlines does not mean that parties can avoid their effect at any stage of the case simply by claiming that they have received new information that they must be allowed to analyze and present to the court. Accordingly, I have disregarded defendant's proposed findings of fact and its responses to plaintiffs' proposed findings of fact that are supported only by statements included in paragraphs 218-26 of Bates's late-filed declaration. I have considered proposed findings of fact and responses that are supported by other, admissible evidence. Because I have disregarded these facts, I need not "strike" portions of the declaration as well; plaintiffs' motion will be denied as unnecessary.

From the parties' proposed findings of fact, I find the following facts to be material and undisputed.

A. Undisputed Facts

United States Patent No. 6,364,839 (the '839 Patent) is titled "Ultrasound Diagnostic Instrument Having Software in Detachable Scanhead." It discloses an ultrasound diagnostic instrument that consists of a main console for displaying ultrasound images and a detachable transducer scanhead. The patent application that led eventually to the '839 patent issued on April 2, 2002. Defendant is the assignee of the patent. The summary of the invention explains that

> [T]he present invention overcomes limitations in the prior art by providing memory in association with the transducer scanhead separate from the console of an ultrasound diagnostic instrument with the memory providing transducer specific data required for system set-up, drive, and data image with transducers for various applications, and depths, and optimization settings that are unique for each.

1. Asserted claims

Claim 1 is the only independent claim included in the '839 patent. The other claims depend from claim 1. Claim 1 discloses:

> 1. An ultrasound diagnostic instrument comprising
>
> a) a console including display electronic circuitry for processing electrical signals for display including a digital processor, a first memory and a first connector coupled to the processor and first memory,
>
> b) a transducer scanhead for generating ultrasound waves and receiving reflected or scattered ultrasound waves,
>
> c) means for coupling the transducer scanhead to the console for transmitting electrical signals to and from the scanhead, and
>
> d) a second memory associated with the scanhead and outside of the console and communicating with the console through a second connector, the second memory storing software and data necessary for use of the transducer scanhead in the ultrasound diagnostic instrument.

2. Accused products

Defendant alleges that plaintiffs' Vivid 7 ultrasound system infringes the '839 patent

when used in combination with a 3V probe. The Vivid 7 is a large cart-based ultrasound system. The 3V probe is a probe that was designed to provide real-time three-dimensional imaging capacity. The software that operates the 3V probe in the Vivid system remains in the Vivid 7 ultrasound system and not in the 3V probe; it is never copied into memory on the 3V probe.

When connected to the 3V probe with a data cable, the Vivid 7 system can send up to 13 different single-instruction commands to the probe. It sends two types of initialization commands: (1) commands that go through a "programmable logic device" to the sub-aperture processors and (2) commands that cause the "programmable logic device" to move data either from the Vivid 7 to the static random access memory. The programmable logic device is hardware that may be configured to perform certain tasks when commands are received. The static random access memory is a data storage device, but it never stores any commands. The sub-aperture processors are connected to the transducer elements that send and receive ultrasonic energy.

B. Opinion

The '839 patent discloses an ultrasound instrument in which the large, cart-based console is attached to a transducer scanhead. The scanhead includes its own memory, which stores software and data necessary for use of the scanhead. Specifically, claim 1 discloses "a

second memory associated with the scanhead and outside of the console and communicating with the console through a second connector, the second memory storing software and data necessary for use of the transducer scanhead in the ultrasound diagnostic instrument." Plaintiffs contend that the accused products, a Vivid 7 system paired with a 3V probe, cannot infringe this claim element for three reasons: (1) no software is stored in the 3V probe scanhead; (2) the software necessary to the operation of the scanhead is stored on the console and not the probe; and (3) the scanhead lacks a memory in which data and software are stored.

Plaintiffs contend also that the court must provide additional construction of the term "software." They maintain that software means "computer programs that are executed by a microprocessor or computer to control the functioning and direct operation of hardware devices." Defendant argues for a simpler and broader construction: "programs usable on a hardware given device." I need not choose between these two proposed constructions, because even under its preferred construction, defendant cannot meet its burden to show that a reasonable jury could conclude that the accused products meet all of the limitations of claim 1 of the '839 patent (or, because the remainder of the asserted claims depend from claim 1, all of the limitations of any of those claims either).

For the purpose of this discussion, I will construe "software" broadly and accept defendant's assertion that the presence of at least *some* elementary "software" in the 3V

probe is shown by the fact that commands sent to the 3V probe from the console may be routed to other hardware within the probe by the programmable logic device. However, this is not nearly enough to show that the Vivid system infringes claim 1. The final limitation of claim 1 is not infringed any time a transducer scanhead stores software. Rather, it is infringed only when that software is "necessary for use of the transducer scanhead in the ultrasound diagnostic instrument." This is where defendant's claim fails.

Defendant has adduced no admissible evidence to support its assertion that the commands sent to and routed by the programmable logic device constitute the software necessary for the use of the transducer scanhead. It is possible that these commands are important and direct critical high-level functions of the scanhead (although given even the disputed facts, I find this unlikely). It is also possible they are simple directions that allow the scanhead to interact with the console in a rudimentary manner. However, in the absence of any additional evidence about the actual function of the transducer scanhead, it would require sheer speculation on the court's behalf to conclude that a reasonable jury could find that the 3V probe stores "software and data necessary for use of the transducer scanhead." With this finding, it is not necessary to consider defendants' assertion of invalidity as to the '839 patent.

ORDER

IT IS ORDERED that

The motion for summary judgment filed by plaintiffs General Electric Company, GE Medical Systems (Norway) AS, GE Yokogawa Medical systems, Ltd., GE Medical Systems Global Technology Company, LLC, GE Medical Systems, Ultrasound & Primary Care Diagnostics LLC, and GE Medical Systems, Inc., regarding U.S. Patents Nos. 6,471,651, 6,364,839, 5,584,294 and 6,120,447 is GRANTED with respect to

(1) Defendant's claim that plaintiffs' Vivid I, Voluson i and Voluson e products infringe claim 1 of defendant's patent no. 6,471,651 either directly or by inducement; and

(2) Defendant's claim that plaintiffs' Vivid 7 ultrasound system and the 3V probe infringe claims 1-4, 22, 14, 15 and 18 of defendant's patent no. 6,364,839, when used in combination.

In all other respects, plaintiffs' motion for summary judgment is DENIED.

FURTHER, IT IS ORDERED that the motion for summary judgment filed by defendant SonoSite, Inc., regarding U.S. Patents Nos. 4,932,415, 5,584,294, 6,120,447, 6,102,859 and 6,418,225 is GRANTED with respect to

(1) Plaintiffs' claim that defendant has infringed claims 1, 3, 4 and 5 of plaintiffs' patent no. 4,932,415, either literally or by equivalence;

(2) Plaintiffs' claim that defendant's MicroMaxx, Titan, M-Turbo and S-Series ultrasound systems infringe claims 1 and 2 of plaintiffs' patent no. 5,584,294 literally or by

equivalence;

(3) Plaintiffs' claim that defendant's MicroMaxx and M-Turbo systems infringe claims 1 through 13 of plaintiffs' 6,120,447 patent literally or by equivalance;

(4) Plaintiffs' claim that defendant's MicroMaxx, Titan, M-Turbo and S-Series ultrasound systems infringe claims 1, 7, 8 and 10 of plaintiffs' patent no. 6,012,859 literally or by equivalence;

(5) Defendant's claim that claims 7-8, 19, 21 and 27-30 of plaintiffs' patent no. 6,418,225 are invalid as anticipated by U.S. Patent 6,490,684;

In all other respects, defendant's motion for summary judgment is DENIED.

FURTHER, IT IS ORDERED that plaintiffs' motion to strike defendant's untimely evidence and arguments, dkt. #327, and plaintiffs' motion to file a reply brief in support of that motion, dkt. #366, are DENIED as unnecessary.

Entered this 24th day of July, 2008.

BY THE COURT:
/s/
BARBARA B. CRABB
District Judge